

FIXING DEVICE AND IMAGE FORMING DEVICE EQUIPPED WITH THE FIXING DEVICE

Publication number: JP2001242740

Publication date: 2001-09-07

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Classification:

- International: G03G21/00; G03G15/20; G03G21/14; G05D23/19;
G03G21/00; G03G15/20; G03G21/14; G05D23/19;
(IPC1-7): G03G15/20; G03G21/00; G03G21/14;
G05D23/19

- European:

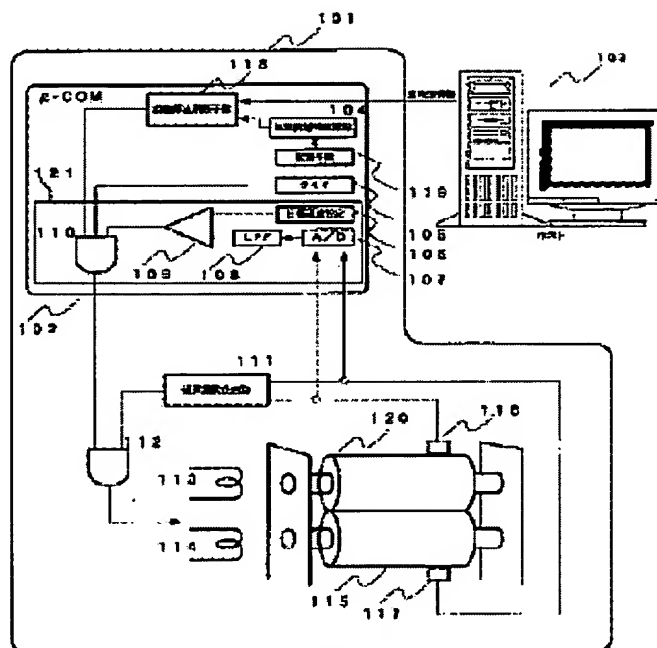
Application number: JP20000051182 20000228

Priority number(s): JP20000051182 20000228

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Abstract of JP2001242740

PROBLEM TO BE SOLVED: To provide the fixing device in which the protection of an excessive temperature up of a heating body or defective fixing due to disconnection or loose connection or the like of a temperature detection body or the heating body can be realized, and the protection of the delay in warmup time of the heating body due to the fluctuation of an operating environment temperature of the device or working power supply voltage can be realized at a low cost, and to provide an image forming device equipped with the fixing device. **SOLUTION:** A judging means 118 for prohibiting heating acquires real time information, and electric power supply from a power source to heaters 113, 114 are prohibited for a prescribed period when the elapsed time from the heating stop of the heaters 113, 114 is prescribed time length or less on the basis of the real time information and heat time information stored in a storage means 119 and abnormalities in detection are stored in the storage means 119.



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(19) 日本国特許庁 (JP)

(12) 公開特許公報 (A)

(11) 特許出願公開番号

特開 2001-242740

(P 2001-242740 A)

(43) 公開日 平成13年9月7日 (2001.9.7)

(51) Int. Cl. ⁷	識別記号	F I	テマコード* (参考)
G 0 3 G 15/20	1 0 9	G 0 3 G 15/20	2H027
	1 0 2		2H033
21/14		21/00	5H323
21/00	5 0 0	G 0 5 D 23/19	C 9A001
G 0 5 D 23/19		G 0 3 G 21/00	3 7 2
審査請求 未請求 請求項の数 6		OL (全12頁)	

(21) 出願番号 特願2000-51182 (P2000-51182)

(22) 出願日 平成12年2月28日 (2000.2.28)

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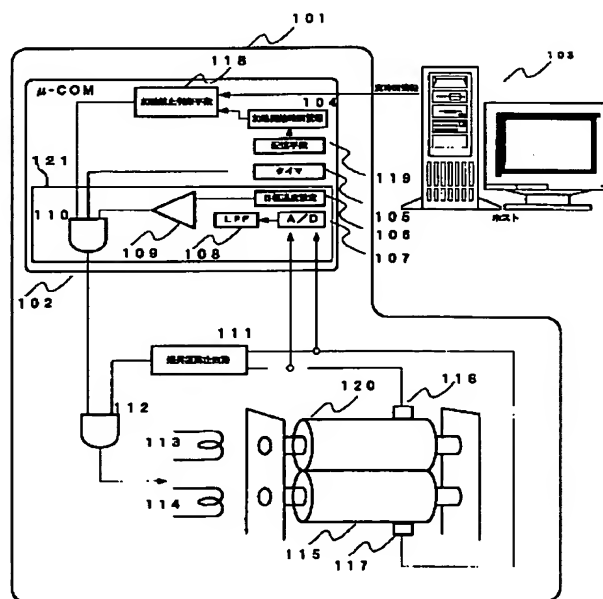
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(54) 【発明の名称】 定着装置及びこの定着装置を備える画像形成装置

(57) 【要約】

【課題】 本発明は、安価に、温度検知体や加熱体の断線や接触不良等による加熱体の過昇温や定着不良の防止を図ることができ、更に、装置の使用環境温度や使用電源電圧の変動による加熱体のウォームアップタイム遅延の防止を図ることができる定着装置及びこの定着装置を備える画像形成装置を提供する。

【解決手段】 加熱禁止判断手段118が、実時間情報を取得し該実時間情報と記憶手段119に記憶された加熱時間情報とに基づきヒータ113、114の加熱停止からの経過時間が所定時間長さ以下であり且つ検出異常が記憶手段119に記憶されている場合に電源からヒータ113、114への電力供給を所定期間禁止させる。



【特許請求の範囲】

【請求項 1】 互いに圧接回転する定着体及び加圧体と、電源からの電力を受けて発熱し該定着体及び該加圧体の少なくとも一方を加熱する加熱体と、該定着体及び該加圧体の少なくとも一方の表面温度を検知する温度検知体と、該温度検知体の検知温度が目標温度となるよう電源から加熱体への電力供給を制御する制御手段とを備え、未定着像を担持する記録媒体を上記定着体及び上記加圧体によって挟持搬送して加圧及び加熱することにより、上記未定着像を上記記録媒体に定着させる定着装置において、加熱体及び温度検知体の少なくとも一方の異常を検知する異常検出手段と、加熱体の加熱開始及び加熱停止の加熱時間情報を取得する加熱時間情報手段と、異常検出手段の検出異常及び時間情報手段の取得された加熱時間情報を記憶可能な記憶手段と、実時間情報を取得し該実時間情報及び上記加熱時間情報に基づき加熱停止からの経過時間が所定時間長さ以下であり且つ上記検出異常が記憶手段に記憶されている場合に電源から加熱体への電力供給を所定期間禁止させる禁止手段とを備えることを特徴とする定着装置。

【請求項 2】 異常検出手段は、電源から加熱体への電力が遮断された後に再投入された場合に、上記電力の遮断から再投入までの加熱停止状態の時間長さが所定時間長さ以下である際に上記電力の遮断時の温度検知体の検知温度からの上記時間長さに基づく加熱体の降下温度に対応する温度より温度検知体の検知温度が低いとき異常を検出するよう設定されていることとする請求項 1 に記載の定着装置。

【請求項 3】 制御手段は、温度検知体の検知温度が目標温度となるよう、電源から加熱体への電力の単位時間当りの通電周期を変更可能であることとする請求項 1 又は請求項 2 に記載の定着装置。

【請求項 4】 一連の画像形成プロセスによって形成された画像を記録媒体に記録する画像形成装置であって、請求項 1 に記載の定着装置を備えることを特徴とする画像形成装置。

【請求項 5】 異常検出手段は、電源から加熱体への電力が遮断された後に再投入された場合に、上記電力の遮断から再投入までの加熱停止状態の時間長さが所定時間長さ以下である際に上記電力の遮断時の温度検知体の検知温度からの上記時間長さに基づく加熱体の降下温度に対応する温度より温度検知体の検知温度が低いとき異常を検出するよう設定されていることとする請求項 4 に記載の画像形成装置。

【請求項 6】 制御手段は、温度検知体の検知温度が目標温度となるよう、電源から加熱体への電力の単位時間当りの通電周期を変更可能であることとする請求項 4 又は請求項 5 に記載の画像形成装置。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】 本発明は、定着装置及びこの定着装置を備える画像形成装置に関するものである。

【0002】

【従来の技術】 従来、プリンタ等の画像形成装置に備えられる定着装置にあっては、互いに圧接回転する定着体たる定着ローラ及び加圧体たる加圧ローラと、該定着ローラ及び該加圧ローラの少なくとも一方を加熱する加熱体たるヒータとを有する熱ローラ方式の定着装置が知られている。

10 【0003】 かかる定着装置は、未定着像たるトナー像を担持する記録媒体たる転写紙を上記定着ローラと上記加圧ローラとの間に通紙して加熱及び加圧することにより、上記トナー像を上記転写紙に融着させ定着させるようになっている。

【0004】 又、かかる定着装置にあっては、一般的に、定着ローラ表面に当接若しくは近接して配設されるサーミスタ等の温度検知体たる温度センサによって定着ローラ表面の温度が検知され、その検知温度情報が、温度検出回路を介してマイクロコンピュータ等のコントローラに入力され、予め設定された定着ローラ表面温度の制御目標値と比較される。そして、温度センサで検知される定着ローラの表面温度が制御目標温度の下限值より低い場合にはヒータがオンされ、該表面温度が制御温度目標値の上限値を超えるとヒータがオフされるよう、ヒータに供給される電力が制御され、定着ローラの表面温度が所定の温度範囲内に維持される。

【0005】

【発明が解決しようとする課題】 しかしながら、かかる定着装置においては、電源投入後のヒータの加熱による昇温確認について、ある程度ヒータの加熱を行ってからでないと、温度センサの検出感度域に入らないため、早期の検出が難しく、例えば、ヒータ加熱中に温度センサの結線が断線した場合、ヒータに電力を供給するための電源の遮断、再投入が行われると、ヒータが異常昇温してしまう虞があった。

【0006】 この原因として、一つには、かかる定着装置に用いられている温度センサでは、常温（室温）程度の温度域で検出感度が著しく低下してしまうことが挙げられ、制御分解能を確保する点からも、定着装置温度制御域と常温域との両方で温度検出することは難しい。これは、定着装置温度制御域のための温度センサと特性の異なる（別に常温付近に感度を有する）温度センサを別途設けることで回避できるが、それに付随する回路等が別途必要となる。

【0007】 又、かかる定着装置においては、サーミスタ素子自身の不良、熱源であるヒータ自身の不良や接触不良によっても上記と同様の異常が発生する虞がある他、ヒータの接触不良等により定着ローラの表面温度が所定の温度まで上がらず、定着ができないという異常が発生する虞もある。

【0008】更に、かかる定着装置においては、使用環境温度、使用電源電圧値が動作保証されている範囲より低い時、ヒータ表面の温度が変動し、ウォームアップタイムが遅くなるといった不具合を起こす虞もある。

【0009】そこで、本発明は、安価に、温度検知体や加熱体の断線や接触不良等による加熱体の過昇温や定着不良の防止を図ることができ、更に、装置の使用環境温度や使用電源電圧の変動による加熱体のウォームアップタイム遅延の防止を図ることができる定着装置及びこの定着装置を備える画像形成装置の提供を目的とする。

【0010】

【課題を解決するための手段】本出願によれば、上記目的は、互いに圧接回転する定着体及び加圧体と、電源からの電力を受けて発熱し該定着体及び該加圧体の少なくとも一方を加熱する加熱体と、該定着体及び該加圧体の少なくとも一方の表面温度を検知する温度検知体と、該温度検知体の検知温度が目標温度となるよう電源から加熱体への電力供給を制御する制御手段とを備え、未定着像を担持する記録媒体を上記定着体及び上記加圧体によって挟持搬送して加圧及び加熱することにより、上記未定着像を上記記録媒体に定着させる定着装置において、加熱体及び温度検知体の少なくとも一方の異常を検知する異常検出手段と、加熱体の加熱開始及び加熱停止の加熱時間情報を取得する加熱時間情報手段と、異常検出手段の検出異常及び時間情報手段の取得された加熱時間情報を記憶可能な記憶手段と、実時間情報を取得し該実時間情報及び上記加熱時間情報に基づき加熱停止からの経過時間が所定時間長さ以下であり且つ上記検出異常が記憶手段に記憶されている場合に電源から加熱体への電力供給を所定期間禁止させる禁止手段とを備えるという第一の発明によって達成される。

【0011】又、本出願によれば、上記目的は、第一の発明において、異常検出手段は、電源から加熱体への電力が遮断された後に再投入された場合に、上記電力の遮断から再投入までの加熱停止状態の時間長さが所定時間長さ以下である際に上記電力の遮断時の温度検知体の検知温度からの上記時間長さに基づく加熱体の降下温度に対応する温度より温度検知体の検知温度が低いとき異常を検出するよう設定されているという第二の発明によっても達成される。

【0012】更に、本出願によれば、上記目的は、第一の発明又は第二の発明において、制御手段は、温度検知体の検知温度が目標温度となるよう、電源から加熱体への電力の単位時間当りの通電周期を変更可能であるという第三の発明によっても達成される。

【0013】又、本出願によれば、上記目的は、一連の画像形成プロセスによって形成された画像を記録媒体に記録する画像形成装置であって、第一の発明の定着装置を備えるという第四の発明によっても達成される。

【0014】更に、本出願によれば、上記目的は、第四

の発明において、異常検出手段は、電源から加熱体への電力が遮断された後に再投入された場合に、上記電力の遮断から再投入までの加熱停止状態の時間長さが所定時間長さ以下である際に上記電力の遮断時の温度検知体の検知温度からの上記時間長さに基づく加熱体の降下温度に対応する温度より温度検知体の検知温度が低いとき異常を検出するよう設定されているという第五の発明によっても達成される。

【0015】又、本出願によれば、上記目的は、第四の発明又は第五の発明において、制御手段は、温度検知体の検知温度が目標温度となるよう、電源から加熱体への電力の単位時間当りの通電周期を変更可能であるという第六の発明によっても達成される。

【0016】即ち、本出願にかかる第一の発明にあっては、禁止手段が、加熱体の加熱停止からの経過時間が所定時間長さ以下であり且つ異常検出手段の検出異常が記憶手段に記憶されている場合に電源から加熱体への電力供給を所定期間禁止させる。

【0017】又、本出願にかかる第二の発明にあっては、異常検出手段が、電源から加熱体への電力の遮断から再投入までの加熱停止状態の時間長さが所定時間長さ以下である際に上記電力の遮断時の温度検知体の検知温度からの上記時間長さに基づく加熱体の降下温度に対応する温度より温度検知体の検知温度が低いとき異常を検出すると共に、禁止手段が、加熱体の加熱停止からの経過時間が所定時間長さ以下であり且つ異常検出手段の検出異常が記憶手段に記憶されている場合に電源から加熱体への電力供給を所定期間禁止させる。

【0018】更に、本出願にかかる第三の発明にあっては、制御手段が、温度検知体の検知温度が目標温度となるよう、電源から加熱体への電力の単位時間当りの通電周期を変更すると共に、禁止手段が、加熱体の加熱停止からの経過時間が所定時間長さ以下であり且つ異常検出手段の検出異常が記憶手段に記憶されている場合に電源から加熱体への電力供給を所定期間禁止させる。

【0019】又、本出願にかかる第四の発明にあっては、禁止手段が、加熱体の加熱停止からの経過時間が所定時間長さ以下であり且つ異常検出手段の検出異常が記憶手段に記憶されている場合に電源から加熱体への電力供給を所定期間禁止させる。

【0020】更に、本出願にかかる第五の発明にあっては、異常検出手段が、電源から加熱体への電力の遮断から再投入までの加熱停止状態の時間長さが所定時間長さ以下である際に上記電力の遮断時の温度検知体の検知温度からの上記時間長さに基づく加熱体の降下温度に対応する温度より温度検知体の検知温度が低いとき異常を検出すると共に、禁止手段が、加熱体の加熱停止からの経過時間が所定時間長さ以下であり且つ異常検出手段の検出異常が記憶手段に記憶されている場合に電源から加熱体への電力供給を所定期間禁止させる。

【0021】又、本出願にかかる第六の発明にあっては、制御手段が、温度検知体の検知温度が目標温度となるよう、電源から加熱体への電力の単位時間当りの通電周期を変更すると共に、禁止手段が、加熱体の加熱停止からの経過時間が所定時間長さ以下であり且つ異常検知手段の検出異常が記憶手段に記憶されている場合に電源から加熱体への電力供給を所定期間禁止させる。

【0022】

【発明の実施の形態】以下、本発明の実施の形態に関して、添付図面に基づき説明する。

【0023】（第一の実施形態）先ず、本発明の第一実施形態の形態について図面に基づき説明する。

【0024】図2は、本実施形態の画像形成装置を好適に示す一例たる電子写真レーザービームプリンタ1（以下、プリンタ1と略称する。）の概略構成を示す模式的断面図である。

【0025】プリンタ1は、プリンタ1の本体の外部に設けられたホストコンピュータ等の画像情報提供装置（図示せず）から提供された画像情報に応じた画像をシート状の記録媒体Pに形成し記録するという一連の画像形成プロセスを公知の電子写真方式に沿って行う形態の画像形成装置である。

【0026】プリンタ1は、図1に示すように、ドラム状の回転自在な潜像担持体たる感光体2と、感光体2の外周面を規定電位分布に帯電せしめる一次帯電ローラ8と、現像装置3と、画像情報提供装置からの画像情報に応じた露光処理工程により感光体2の外周面上に上記画像情報に応じた静電潜像を形成するためのレーザスキャヌユニット5（以下、スキャナ5と略称する。）と、記録媒体Pに転写処理工程を施すためのロール状の回転自在な転写体6と、転写処理済みの記録媒体Pに加熱及び加圧により定着処理を施すようになっている定着装置7とを備えている。

【0027】かかる画像形成装置にあっては、先ず、感光体2が図1に示す矢印方向に規定周速度にて回転駆動を開始されると共に、規定バイアスが印加されている帯電ローラ11と感光体2とが互いに摺接し合うことにより感光体2の外周面が規定電位分布に帯電せしめられる。

【0028】次に、画像情報提供装置からの画像情報に応じて感光体2の外周面の帯電処理済みの部位がスキャナ5により走査及び露光されることにより上記画像情報に応じた静電潜像が上記部位に形成されたのち、現像装置3の現像剤により上記静電潜像が顕像に可視像化される。

【0029】一方、所定枚数の記録媒体Pを収容可能であると共にプリンタ1の本体にて取り外し自在に支持されたカセット11から回転自在な給紙ローラ12等により感光体2と転写体6との間に形成された空間へと所定のタイミング等にて搬送される。

【0030】感光体2と転写体6との間に搬送されてきた記録媒体Pは、転写体6により上記顕像が転写される。

【0031】そして、転写処理済みの記録媒体Pは、定着装置7により定着処理が施されたのちプリンタ1の本体にて回転自在に支持された排紙ローラ13により機外へと排紙され上記本体の一側面に取り付けられたトレイ14上に積層されることにより、一連の画像形成プロセスが終了することとなる。

10 【0032】次に、定着装置7について図2に基づき説明する。

【0033】図2は、定着装置7及びその制御系の構成を示すブロック図である。

【0034】定着装置7は、互いに圧接回転する定着体及び加圧体たる定着ローラ115、120と、電源からの電力を受けて発熱し定着ローラ115、120を加熱する加熱体たるヒータ113、114と、定着ローラ115、120の表面温度を検知する温度検知体たる温度センサ116、117と、温度センサ116、117の検知温度が目標温度となるよう電源からヒータ113、114への電力供給を制御する制御手段121とを備え、未定着像を担持する記録媒体を上記定着体及び上記加圧体によって挟持搬送して加圧及び加熱することにより、上記未定着像を上記記録媒体に定着させるようになっている。

【0035】又、かかる定着装置7は、異常検出手段及び禁止手段たる加熱禁止判断手段118と、加熱時間情報手段たるタイマ105と、記憶手段119とを備えている。

30 【0036】ここで、定着装置7のヒータ113、114又は温度センサ116、117の異常検出について説明する。

【0037】図2に示すように、プリンタ1の定着装置7制御に関する制御ブロック101にあっては、先ず、マイコン102内の加熱禁止判断手段118がホスト103との通信により実時間情報を得る。次に、加熱禁止判断手段118がEEPROM等で構成される記憶手段119からヒータ113、114の加熱開始及び加熱停止の加熱時間情報104を読み出す。

40 【0038】上記実時間情報及び上記加熱時間情報104により、ヒータ113、114が所定時間長さ以上加熱停止状態にあったか否かを判断し、ヒータ113、114の加熱停止状態が所定時間長さ以下であった場合には、その加熱停止時間長さに見合った温度であるかを確認する。つまり、このときの温度センサ116、117の検知温度が動作保証内であれば正常とみなし、通常の制御に戻る。

50 【0039】しかし、ヒータ113、114の加熱停止から所定時間長さが経過しておらず、ヒータ113、114、温度センサ116、117が異常である旨のエラ

ーログが記憶手段119に残っている場合に、温度センサ116、117の検出値が低い時には、警告メッセージを表示し、所定時間の待機を行ってから、ヒータ113、114の再加熱が行なわれる。この待機時間は、通常の使用状態で、常温からヒータ113、114に通電し、温度センサ116、117の出力をマイコン102において確認できる程度の定着ローラ115、120の温度低下を見込まなければならない。

【0040】尚、定着ローラ対は、ヒータによる加熱時に加圧状態にしておく、接触部の温度上昇が大きくなってしまうので、ローラ対の加圧解除機能をもち、通紙時以外は加圧しない構成を採ってもよい。

【0041】又、ヒータ113、114の加熱開始から、タイマ105により設定された所定時間時に温度センサ116、117の温度検出値が所定温度に達しているか否かが調べられ、上記温度検出値が所定温度に達していない場合には異常と判断される。このときの異常の原因としては、ヒータ113、114が断線しているとか、温度センサが定着ローラから離れている等が考えられる。

【0042】異常と判断されると、ヒータ113、114の加熱が停止され、異常をホスト103に送信したり、表示パネル(図示せず)に表示される。これにより、ヒータ113、114、温度センサ116、117が異常である旨をオペレータに速やかに知らせることとなる。

【0043】ここで、プリンタ1が、ネットワーク、電話回線に繋がれていれば、オンラインでのサービスコールが可能となる。これにより、不良サーミスタ素子の取替え等、迅速な対処が可能となる。

【0044】又、上記異常が解消され解除手段によってヒータ113、114の駆動停止が解除されるまで、記憶手段119が異常状態であることを記憶保持し、機械の誤作動を阻止するように構成することも可能である。

【0045】ここで、定着装置中の定着ローラ115、120は、各々ヒータ113、114によって加熱されている。これらを同一温度に制御しているのであれば、これらのローラ表面温度を検出する温度センサ116、117の温度差が、所定範囲に収まっていなければ、異常と判断することができる。

【0046】又、電源を遮断した後に再投入した場合に、温度センサ116、117の検出値、記憶手段119の記憶情報、実時間情報により、異常検出時間設定を変更することで、早期の検出が可能となる。

【0047】温度センサ116、117の温度検出値は、A/D変換器107によりA/D変換を施されてマイコン102内の制御手段121に取り込まれる。

【0048】A/D変換された上記温度検出値は、LPF演算部108でノイズを除去された後、比較器109で目標設定温度106と比較される。

【0049】判断出力手段110が、比較器109の比較結果に基づき、ヒータ113、114を加熱するか否かを判断し、最終的にマイコン102から、その結果を出力する。

【0050】一方、過昇温防止回路111によって、マイコン102を介在させずに、ヒータ113、114の過昇温が検出され、ヒータ113、114の加熱が停止される。

【0051】そして、判断回路112は、加熱判断手段110の判断結果と過昇温防止回路111の過昇温検出結果とに基づき、最終的にヒータ113、114に電源から電力を供給するか否かの判断をする。

【0052】ここで、温度センサ116、117による定着ローラ115、120の表面温度検出値が、定着ローラ115、120の表面温度として通常時ではありえないような温度値(例えば、装置の環境温度よりもかなり低い温度値等)と比較され、低いときに異常と判断される。

【0053】異常と判断されると、加熱禁止判断手段118によりヒータ113、114の加熱が停止され異常処理がなされる。この異常の原因としては、ヒータ113、114が断線している等が考えられる。

【0054】又、一旦所定温度を超えた場合でも、温度センサ116、117の取付不良等により温度センサ116、117による検知温度が下がることはありうるので、所定温度への上昇後の、下限温度を設定し、それを下回った場合には異常と判断することも有効である。他に、異常時には、表示手段によるオペレータへの通報、保持手段により異常状態を記憶保持し、所定の解除手段による処理が行われるまでヒータ113、114の加熱停止を実行する構成も考えられる。

【0055】ここで、マイコン102における制御動作のフローチャートを図3に示す。

【0056】(ステップ401)電源投入時にホスト103との通信により、実時間情報を取得される。

【0057】(ステップ402)加熱禁止判断手段118が加熱時間情報を記憶手段119より読み出す。

【0058】(ステップ403)加熱禁止判断手段118が上記実時間情報及び上記加熱時間情報とから、ヒータ113、114が所定時間以上加熱停止状態にあったか否かを判断し、そうであればステップ406へ、そうでなければステップ404へ進む。

【0059】(ステップ404)温度センサ116、117の検出値が、加熱時間情報より得られるものに見合った温度であるか否かを確認し、そうであればステップ405へ進み、そうでなければステップ405へ進む。

【0060】(ステップ405)記憶手段119に保存されているエラーログ及び加熱時間情報によるエラーメッセージをパネル(図示せず)に表示し、ホスト103へステータスを送信する。この状態で、エラーが解除さ

れるまで待機するか、或いは、復帰可能であれば、所定時間待機した後ステップ406へ進む。

【0061】(ステップ406)温度センサ116, 117の検出値がA/D変換器107によってA/D変換されてマイコン102内へ取り込まれる。

【0062】(ステップ407)マイコン102内に取り込まれた温度センサ116, 117の検出値にLPF演算部108がノイズ除去のためのローパスフィルタリングを施す。

【0063】(ステップ408)温度センサ116, 117の温度差が所定範囲に収まっているか否か、温度センサ116, 117の温度差が所定値以内か否かを判断し、異常と判断されれば、ステップ409へ進み、異常と判断されなければ410に進む。

【0064】(ステップ409)エラー処理(パネルへの表示、ホスト103へのステータス送信)が行なわれる。

【0065】(ステップ410)比較器109によって温度センサ116, 117の検知温度が目標設定温度に達しているか否かが判断され、達していなければステップ411へ進み、達していればステップ412へ進む。

【0066】(ステップ411)ヒータをオンしステップ406へ戻る。

【0067】(ステップ412)ヒータのオフしステップ406へ戻る。

【0068】よって、本実施形態によれば、定着ローラ115, 120表面温度検出用の温度センサ116, 117の不良或いは温度センサ116, 117の取付不良に起因する誤動作、例えば、規定以上に定着ローラ115, 120表面の温度が上昇することが防がれ、それに伴う紙のカール、ジャムの発生が防止され、装置破損の防止に効果が得られる。又ヒータ113, 114の不良、接触不良により温度が所定温度に達しないために起こる定着不良の防止にも効果が得られる。

【0069】(第二の実施形態)次に、本発明の第二の実施形態について図面に基づき説明する。尚、第一実施形態と同様の構成に関しては、同一符号を付し、その説明を省略する。

【0070】本実施形態にあつては、第一の実施形態と同様の定着装置制御に加え、図4に示すような制御手法により、基本的には、定着装置からの放熱分と、所定時間あたりのヒータの通電割合との均衡するところを算出し、その通電割合により、加熱を行っていくことで、不要な温度変動を抑えるものである。

【0071】ヒータ113, 114の電源投入時の加熱開始から、所定温度を超えた時点で、図4(a)で示すプリセットされた加熱制御を行う。これは、例えば、環境温度25℃、電源電圧100Vの時に、定着装置の表面温度を160℃に保持する通電割合に設定されている。そして、その均衡温度を検出し、通電割合の補正を

行う。

【0072】ここで、マイコン102における制御動作のフローチャートを図5に示す。

【0073】(ステップ501)電源投入時にホスト103との通信により、実時間情報を取得される。

【0074】(ステップ502)加熱禁止判断手段118が加熱時間情報を記憶手段119より読み出す。

【0075】(ステップ503)加熱禁止判断手段118が上記実時間情報及び上記加熱時間情報とから、ヒータ113, 114が所定時間以上加熱停止状態にあったか否かを判断し、そうであればステップ406へ、そうでなければステップ404へ進む。

【0076】(ステップ504)温度センサ116, 117の検出値が、加熱時間情報より得られるものに見合った温度であるか否かを確認し、そうであればステップ405へ進み、そうでなければステップ405へ進む。

【0077】(ステップ505)記憶手段119に保存されているエラーログ及び加熱時間情報によるエラーメッセージをパネル(図示せず)に表示し、ホスト103へステータスを送信する。この状態で、エラーが解除されるまで待機するか、或いは、復帰可能であれば、所定時間待機した後ステップ406へ進む。

【0078】(ステップ506)温度センサ116, 117の検出値がA/D変換器107によってA/D変換されてマイコン102内へ取り込まれる。

【0079】(ステップ507)マイコン102内に取り込まれた温度センサ116, 117の検出値にLPF演算部108がノイズ除去のためのローパスフィルタリングを施す。

【0080】(ステップ508)温度センサ116, 117の温度差が所定範囲に収まっているか否か、温度センサ116, 117の温度差が所定値以内か否かを判断し、異常と判断されれば、ステップ409へ進み、異常と判断されなければ410に進む。

【0081】(ステップ509)エラー処理(パネルへの表示、ホスト103へのステータス送信)が行なわれる。

【0082】(ステップ510)温度センサ116, 117の検知温度がヒータ加熱制御切り替え設定温度以上か否かを判断し、ヒータ加熱制御切り替え設定温度以上であればステップ512へ進み、ヒータ加熱制御切り替え設定温度以下であればステップ511へ進む。

【0083】(ステップ511)ヒータをONにして、ステップ406へ戻る。

【0084】(ステップ512)温度センサ116, 117の検知温度が目標温度以下か否かを判断し、そうであればステップ413へ進み、そうでなければステップ406へ戻る。

【0085】(ステップ513)図4で示すヒータ113, 114の加熱制御を行う。

【0086】図4は、図5のフローチャート上のステップ513におけるヒータ113、114の加熱制御について示したものである。図4(a)のデフォルト状態は、EEPROM等の記憶手段119に保存された、出荷時にプリセット、或いは、前回の制御時に測定された定着装置7からの放熱分と均衡する加熱割合によるヒータ113、114のオン、オフ状態を示したものである。

【0087】この周期に関しては、ヒータ表面の温度変化に現れない(プロセス上問題にならない変動量となる)周期にする必要があり、又、ヒータの応答性、フリッカーへの影響を考慮しなければならない。ヒータ113、114のオン状態にするタイミングに一定の間隔を持つことで、これに影響される電源変動を小さくする。

【0088】ここで、ヒータ113、114は通常AC電源ラインより直接供給されるので、地域、環境などによる電源電圧変動の影響を受けてしまう。又、固体ばらつき、環境温度による影響も受け、ウォームアップタイムが遅くなるなどの影響が生じてしまう。これらの影響を緩和するために、電源電圧、環境温度をモニターし、

【0089】そこで、本実施形態では、制御中に、所定時間あたりの通電割合に対する、例えば、その通電割合に変更した数分後の温度センサ116、117の検出値と、目標温度(その通電割合に対応したデフォルトの温度)との差により、通電手記の変更を行っていくことで、常に適当な加熱制御が実現できる(図4(b)、(c))。他に、供給熱量の制御手法に関しては、図6のように各通電サイクルにオン期間を付帯することでも可能である。

【0090】又、通紙時においては、紙種、幅、長さ等の情報により、損失分の熱量を設定し、該通電周期に付加することで、通紙時の温度変動を小さく抑えることが可能となる。

【0091】つまり、制御手段121がヒータ113、114への所定単位時間あたりの通電期間を変更可能とすることにより、安定する温度センサ116、117の検出値と目標温度とにより該通電周期を変更していくことにより、使用環境温度、使用電源電圧に応じた、最適な加熱制御を行うことで、温度制御時の定着ローラ表面の温度変化を抑える。

【0092】よって、本実施形態によれば、定着ローラ115、120表面温度検出用の温度センサ116、117の不良或いは温度センサ116、117の取付不良に起因する誤動作、例えば、規定以上に定着ローラ115、120表面の温度が上昇することが防がれ、それに伴う紙のカール、ジャムの発生が防止され、装置破損の防止に効果が得られる。又ヒータ113、114の不良、接触不良により温度が所定温度に達しないために起

こる定着不良の防止にも効果が得られる。

【0093】又、本実施形態によれば、安定する温度センサ116、117の検出値と目標温度とによりヒータ113、114の単位時間あたりの通電周期を変更していくことにより、使用環境温度、使用電源電圧に応じた最適な加熱制御を行うことで、温度制御時の定着ローラ115、120表面の温度変動を抑える効果が得られる。

【0094】

10 【発明の効果】以上説明したように、本出願にかかる第一の発明によれば、禁止手段が、加熱体の加熱停止からの経過時間が所定時間長さ以下であり且つ異常検知手段の検出異常が記憶手段に記憶されている場合に電源から加熱体への電力供給を所定期間禁止させるので、温度検知体や加熱体の断線や接触不良等による加熱体の過昇温や定着不良の防止を図ることができる。

【0095】又、本出願にかかる第二の発明によれば、異常検出手段が、電源から加熱体への電力の遮断から再投入までの加熱停止状態の時間長さが所定時間長さ以下である際に上記電力の遮断時の温度検知体の検知温度からの上記時間長さに基づく加熱体の降下温度に対応する温度より温度検知体の検知温度が低いとき異常を検出すると共に、禁止手段が、加熱体の加熱停止からの経過時間が所定時間長さ以下であり且つ異常検知手段の検出異常が記憶手段に記憶されている場合に電源から加熱体への電力供給を所定期間禁止させるので、上記電力の再投入後の温度検知体や加熱体の異常を早期に検出でき、温度検知体や加熱体の断線や接触不良等による加熱体の過昇温や定着不良の防止を図ることができる。

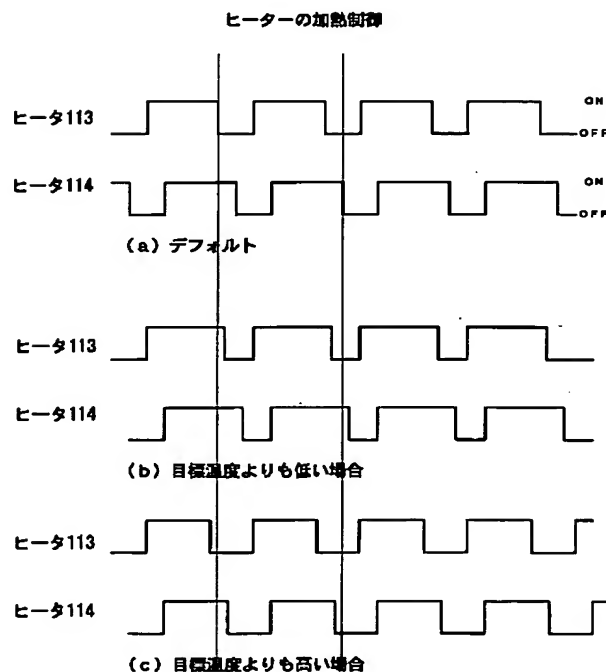
30 【0096】更に、本出願にかかる第三の発明によれば、制御手段が、温度検知体の検知温度が目標温度となるよう、電源から加熱体への電力の単位時間当りの通電周期を変更すると共に、禁止手段が、加熱体の加熱停止からの経過時間が所定時間長さ以下であり且つ異常検知手段の検出異常が記憶手段に記憶されている場合に電源から加熱体への電力供給を所定期間禁止させるので、温度検知体や加熱体の断線や接触不良等による加熱体の過昇温や定着不良の防止を図ることができ、更に、装置の使用環境温度や使用電源電圧の変動による加熱体のウォームアップタイム遅延の防止を図ることができる。

40 【0097】又、本出願にかかる第四の発明によれば、禁止手段が、加熱体の加熱停止からの経過時間が所定時間長さ以下であり且つ異常検知手段の検出異常が記憶手段に記憶されている場合に電源から加熱体への電力供給を所定期間禁止させるので、温度検知体や加熱体の断線や接触不良等による加熱体の過昇温や定着不良の防止を図ることができる。

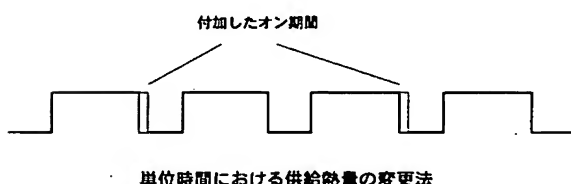
50 【0098】更に、本出願にかかる第五の発明によれば、異常検出手段が、電源から加熱体への電力の遮断から再投入までの加熱停止状態の時間長さが所定時間長さ

【図 1】 本発明の第一の実施形態にかかる画像形成装置

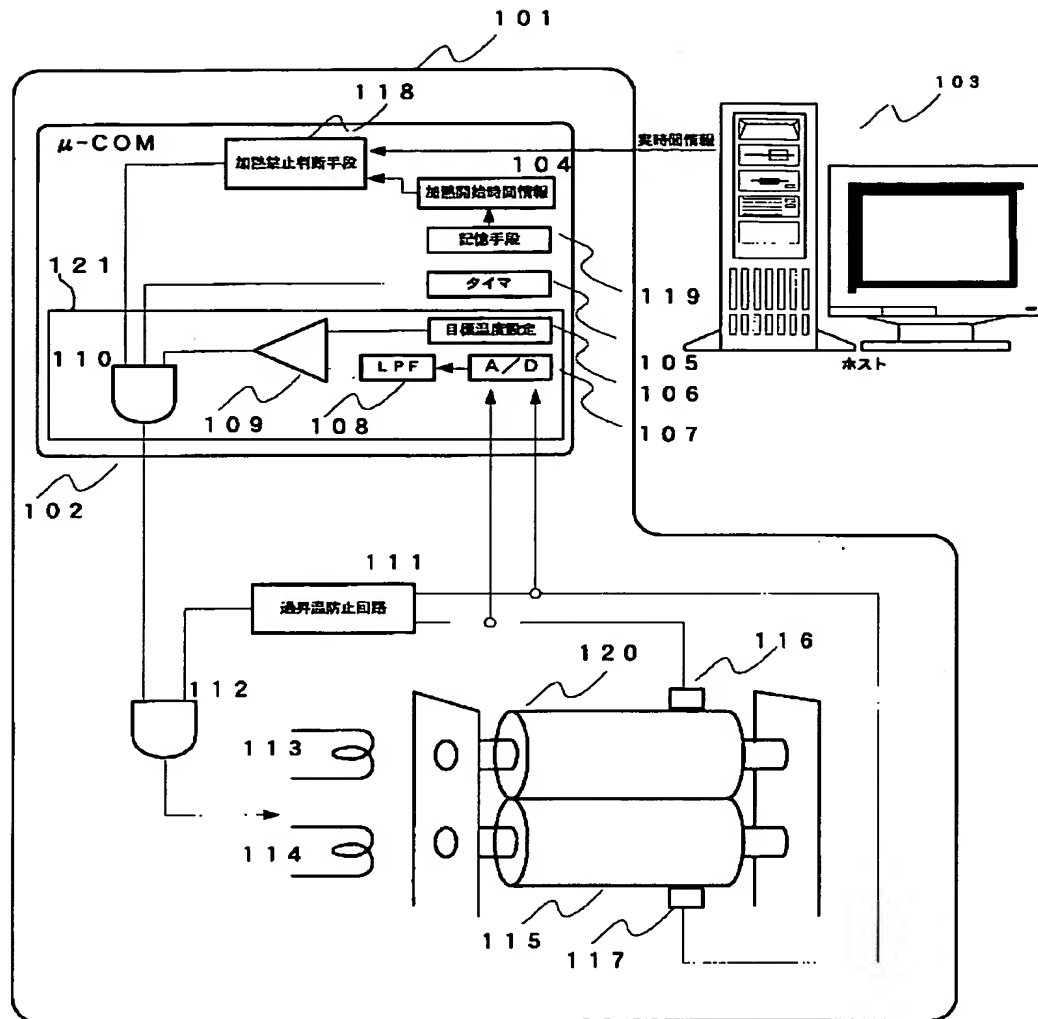
【图 4】



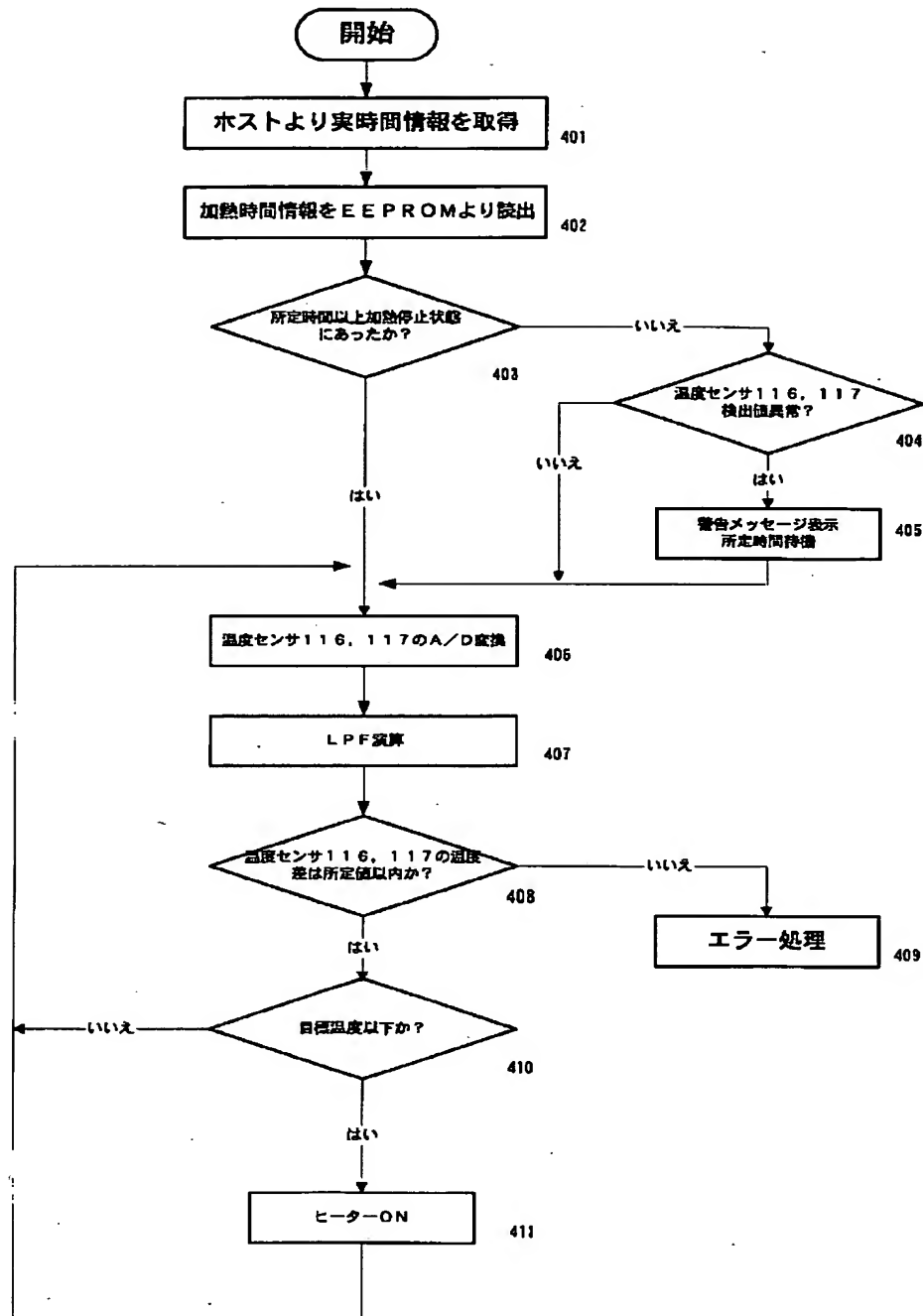
【图 6】



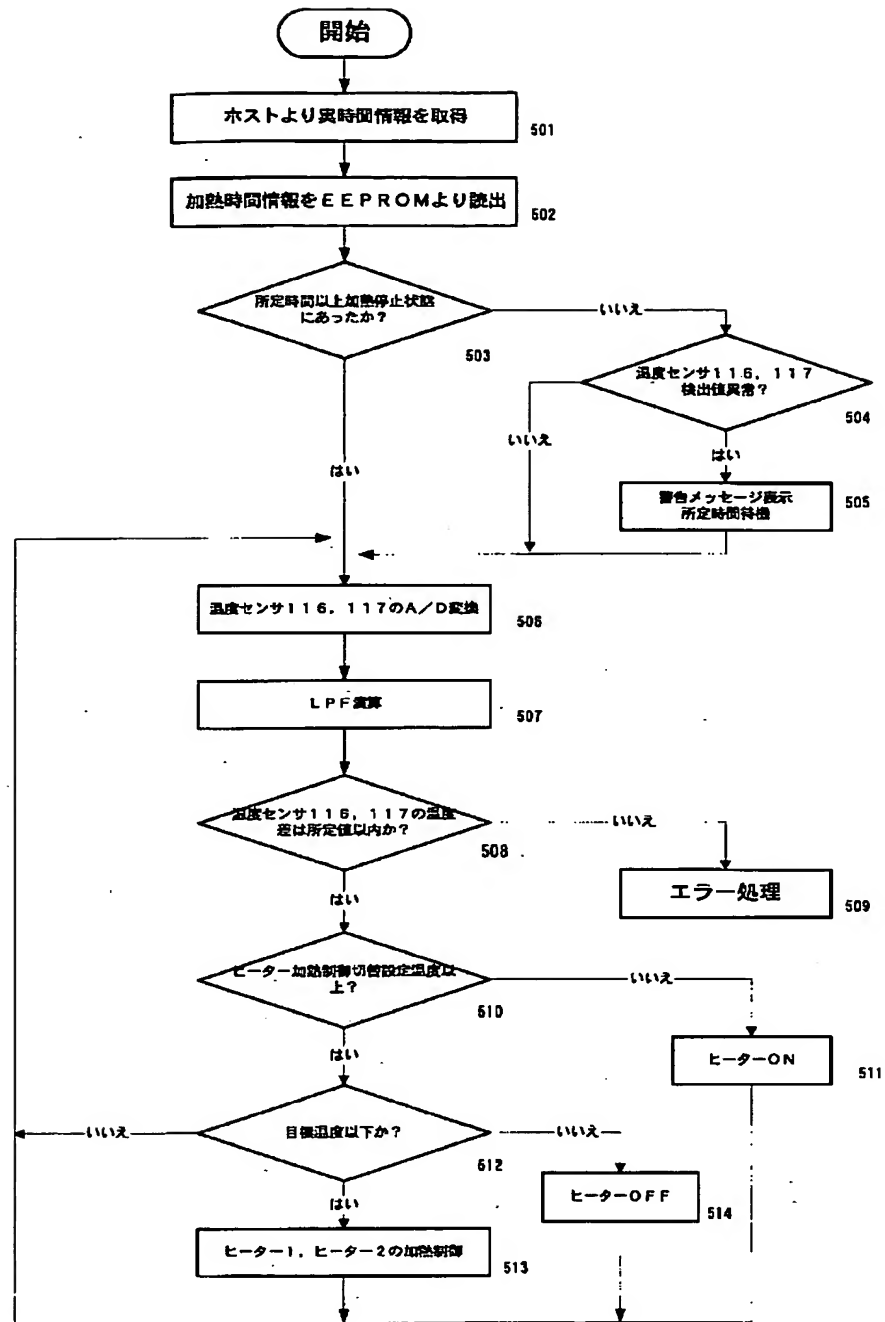
【図2】



【図 3】



【図5】



フロントページの続き

F ターム (参考) 2H027 DA12 DA39 DA40 DC05 DE01
DE07 DE09 EA12 EC06 EC09
EC10 ED25 EE01 EE07 EE08
EK01 GB07 HA04 HB17 JA11
JC08
2H033 AA02 AA24 AA30 BA08 BA25
BA30 BB01 BB18 BB28 BB34
CA06 CA07 CA23 CA24 CA28
CA30 CA32 CA34 CA45 CA46
5H323 AA36 BB17 CA09 CB02 FF03
FF10 GG04 KK07 MM02 MM09
NN03 NN15 QQ06 RR01 RR04
SS01 TT02 TT09
9A001 BB06 HH34 JJ35 KK42

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CLAIMS

[Claim(s)]

[Claim 1] The fixation object and application-of-pressure object which carry out a pressure-welding revolution mutually, and the heating object which generates heat in response to the power from a power source, and heats either [at least] this fixation object or this application-of-pressure object, The temperature detection object which detects one [at least] skin temperature of this fixation object and this application-of-pressure object, By having the control means which controls the electric power supply from a power source to a heating object so that the detection temperature of this temperature detection object may turn into target temperature, carrying out pinching conveyance, and pressurizing and heating the record medium which supports a non-established image with the above-mentioned fixation object and the above-mentioned application-of-pressure object A malfunction detection means to detect one [at least] abnormalities of a heating object and a temperature detection object in the anchorage device which fixes the above-mentioned non-established image to the above-mentioned record medium, A heating time information means to acquire the heating time information on heating initiation of a heating object, and a heating halt, A storage means by which the heating time information from which the abnormalities in detection of a malfunction detection means and a hour entry means were acquired is memorizable, Real-time information The anchorage device characterized by having a prohibition means to carry out predetermined period prohibition of the electric power supply from a power source to a heating object when it acquires, and the elapsed time from a heating halt is below predetermined time die length and the above-mentioned abnormalities in detection are memorized by the storage means based on this real-time information and the above-mentioned heating time information.

[Claim 2] When the reclosing of the malfunction detection means is carried out after the power from a power source to a heating object was intercepted In case the time amount die length of the heating idle state from cutoff of the above-mentioned power to a reclosing is below predetermined time die length, when the detection temperature of a temperature detection object is lower than the temperature corresponding to the drop temperature of the heating object based on the above-mentioned time amount die length from the detection temperature of the temperature detection object at the time of cutoff of the above-mentioned power The anchorage device according to claim 1 it is supposed that is set up so that abnormalities may be detected.

[Claim 3] A control means is an anchorage device according to claim 1 or 2 to which it is supposed that the energization period per unit time amount of the power from a power source to a heating object can be changed so that the detection temperature of a temperature detection object may turn into target temperature.

[Claim 4] Image formation equipment which is image formation equipment which records the image formed of a series of image formation processes on a record medium, and is characterized by having an anchorage device according to claim 1.

[Claim 5] When the reclosing of the malfunction detection means is carried out after the power from a power source to a heating object was intercepted In case the time amount die length of the heating idle state from cutoff of the above-mentioned power to a reclosing is below predetermined time die length, when the detection temperature of a temperature detection object is lower than the temperature corresponding to the drop temperature of the heating object based on the above-mentioned time amount die length from the detection temperature of the temperature detection object

at the time of cutoff of the above-mentioned power Image formation equipment according to claim 4 it is supposed that is set up so that abnormalities may be detected.

[Claim 6] A control means is image formation equipment according to claim 4 or 5 to which it is supposed that the energization period per unit time amount of the power from a power source to a heating object can be changed so that the detection temperature of a temperature detection object may turn into target temperature.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to image formation equipment equipped with an anchorage device and this anchorage device.

[0002]

[Description of the Prior Art] If it is in the anchorage device with which image formation equipments, such as a printer, are equipped conventionally, the anchorage device of the heat mechanical control by roller which has the heating object slack heater which heats at least one side of the fixation object slack fixing roller and application-of-pressure object slack application-of-pressure roller which carry out a pressure-welding revolution mutually, and a this fixing roller and this application-of-pressure roller is known.

[0003] this anchorage device -- being un-established -- an image -- a toner image is supported -- a record medium -- by ****(ing) a transfer paper between the above-mentioned fixing roller and the above-mentioned application-of-pressure roller, and heating and pressurizing it, welding of the above-mentioned toner image is carried out to the above-mentioned transfer paper, and it is fixed to it.

[0004] Moreover, if it is in this anchorage device, generally, the temperature on the front face of a fixing roller is detected by temperature detection object slack temperature sensors, such as a thermistor arranged in a fixing roller front face by contacting or approaching, and the detection temperature information is inputted into controllers, such as a microcomputer, through a temperature detector, and it is compared with the control-objectives value of the fixing roller skin temperature set up beforehand. And if a heater is turned on and this skin temperature exceeds the upper limit of control temperature desired value when the skin temperature of the fixing roller detected with a temperature sensor is lower than the lower limit of control-objectives temperature, the power supplied to a heater will be controlled and the skin temperature of a fixing roller will be maintained in a predetermined temperature requirement so that a heater may be turned off.

[0005]

[Problem(s) to be Solved by the Invention] However, after heating a heater to some extent about the temperature-up check by heating of the heater behind powering on in this anchorage device, unless it comes out, in order not to go into the detection sensitivity region of a temperature sensor, early detection was difficult, for example, when the connection of a temperature sensor was disconnected during heater heating and cutoff of the power source for supplying power to a heater and a reclosing were performed, there was a possibility that a heater might carry out abnormality temperature up.

[0006] as this cause, it mentions to one that detection sensitivity falls remarkably in the temperature region of ordinary temperature (room temperature) extent with the temperature sensor used for this anchorage device -- having -- control -- it is difficult to carry out temperature detection in both an anchorage device temperature control region and an ordinary temperature region also from the point of securing resolution. Although this can avoid the temperature sensor for an anchorage device temperature control region, and the temperature sensor with which properties differ (it has sensibility near ordinary temperature independently) by preparing separately, the circuit which accompanies it is needed separately.

[0007] Moreover, in this anchorage device, there is a possibility that the same abnormalities as the

above may occur also by the own defect of a thermistor component, and the own defect and own poor contact of a heater which are a heat source, and also the skin temperature of a fixing roller does not go up to predetermined temperature by the poor contact of a heater etc., but there is a possibility that the abnormalities that fixation is impossible may occur.

[0008] Furthermore, in this anchorage device, when operating environment temperature and an operating supply voltage value are lower than the range by which the guarantee of operation is offered, the temperature on the front face of a heater is changed, and there is also a possibility of causing the nonconformity that a worm uptime becomes late.

[0009] Then, this invention can aim at prevention of the overheating of a heating object, or poor fixation by an open circuit of a temperature detection object and a heating object, a poor contact, etc., and aims cheap at offer of image formation equipment equipped with the anchorage device which can aim at prevention of worm uptime delay of the heating object by fluctuation of the operating environment temperature of equipment or operating supply voltage, and this anchorage device further.

[0010]

[Means for Solving the Problem] The fixation object and application-of-pressure object in which the above-mentioned object carries out a pressure-welding revolution according to this application, The heating object which generates heat in response to the power from a power source, and heats either [at least] this fixation object or this application-of-pressure object, The temperature detection object which detects one [at least] skin temperature of this fixation object and this application-of-pressure object, By having the control means which controls the electric power supply from a power source to a heating object so that the detection temperature of this temperature detection object may turn into target temperature, carrying out pinching conveyance, and pressurizing and heating the record medium which supports a non-established image with the above-mentioned fixation object and the above-mentioned application-of-pressure object A malfunction detection means to detect one [at least] abnormalities of a heating object and a temperature detection object in the anchorage device which fixes the above-mentioned non-established image to the above-mentioned record medium, A heating time information means to acquire the heating time information on heating initiation of a heating object, and a heating halt, A storage means by which the heating time information from which the abnormalities in detection of a malfunction detection means and a hour entry means were acquired is memorizable, By first invention of having a prohibition means to carry out predetermined period prohibition of the electric power supply from a power source to a heating object when real-time information is acquired, the elapsed time from a heating halt is below predetermined time die length and the above-mentioned abnormalities in detection are memorized by the storage means based on this real-time information and the above-mentioned heating time information It is attained.

[0011] According to this application, the above-mentioned object is set to the first invention.

Moreover, a malfunction detection means When a reclosing is carried out after the power from a power source to a heating object was intercepted In case the time amount die length of the heating idle state from cutoff of the above-mentioned power to a reclosing is below predetermined time die length, when the detection temperature of a temperature detection object is lower than the temperature corresponding to the drop temperature of the heating object based on the above-mentioned time amount die length from the detection temperature of the temperature detection object at the time of cutoff of the above-mentioned power It is attained by the second invention of being set up so that abnormalities may be detected.

[0012] Furthermore, according to this application, a control means is attained by the third invention that the energization period per unit time amount of the power from a power source to a heating object can be changed so that, as for the above-mentioned object, the detection temperature of a temperature detection object may turn into target temperature in the first invention or invention of the second.

[0013] Moreover, according to this application, the above-mentioned object is image formation equipment which records the image formed of a series of image formation processes on a record medium, and is attained by the fourth invention of having the anchorage device of the first invention.

[0014] According to this application, the above-mentioned object is set to the fourth invention.

Furthermore, a malfunction detection means When a reclosing is carried out after the power from a power source to a heating object was intercepted In case the time amount die length of the heating idle state from cutoff of the above-mentioned power to a reclosing is below predetermined time die length, when the detection temperature of a temperature detection object is lower than the temperature corresponding to the drop temperature of the heating object based on the above-mentioned time amount die length from the detection temperature of the temperature detection object at the time of cutoff of the above-mentioned power It is attained by the fifth invention of being set up so that abnormalities may be detected.

[0015] Moreover, according to this application, a control means is attained by the sixth invention that the energization period per unit time amount of the power from a power source to a heating object can be changed so that, as for the above-mentioned object, the detection temperature of a temperature detection object may turn into target temperature in the fourth invention or invention of the fifth.

[0016] That is, if it is in the first invention concerning this application, a prohibition means is [the elapsed time from a heating halt of a heating object] below predetermined time die length, and when the abnormalities in detection of an abnormality detection means are memorized by the storage means, predetermined period prohibition of the electric power supply from a power source to a heating object is carried out.

[0017] If it is in the second invention concerning this application, moreover, a malfunction detection means In case the time amount die length of the heating idle state from cutoff of the power from a power source to a heating object to a reclosing is below predetermined time die length, when the detection temperature of a temperature detection object is lower than the temperature corresponding to the drop temperature of the heating object based on the above-mentioned time amount die length from the detection temperature of the temperature detection object at the time of cutoff of the above-mentioned power While detecting abnormalities, a prohibition means is [the elapsed time from a heating halt of a heating object] below predetermined time die length, and when the abnormalities in detection of an abnormality detection means are memorized by the storage means, predetermined period prohibition of the electric power supply from a power source to a heating object is carried out.

[0018] Furthermore, if it is in the third invention concerning this application While changing the energization period per unit time amount of the power from a power source to a heating object so that the detection temperature of a temperature detection object may turn into target temperature, a control means A prohibition means is [the elapsed time from a heating halt of a heating object] below predetermined time die length, and when the abnormalities in detection of an abnormality detection means are memorized by the storage means, predetermined period prohibition of the electric power supply from a power source to a heating object is carried out.

[0019] Moreover, if it is in the fourth invention concerning this application, a prohibition means is [the elapsed time from a heating halt of a heating object] below predetermined time die length, and when the abnormalities in detection of an abnormality detection means are memorized by the storage means, predetermined period prohibition of the electric power supply from a power source to a heating object is carried out.

[0020] Furthermore, if it is in the fifth invention concerning this application A malfunction detection means In case the time amount die length of the heating idle state from cutoff of the power from a power source to a heating object to a reclosing is below predetermined time die length, when the detection temperature of a temperature detection object is lower than the temperature corresponding to the drop temperature of the heating object based on the above-mentioned time amount die length from the detection temperature of the temperature detection object at the time of cutoff of the above-mentioned power While detecting abnormalities, a prohibition means is [the elapsed time from a heating halt of a heating object] below predetermined time die length, and when the abnormalities in detection of an abnormality detection means are memorized by the storage means, predetermined period prohibition of the electric power supply from a power source to a heating object is carried out.

[0021] Moreover, while a control means changes the energization period per unit time amount of the power from a power source to a heating object so that the detection temperature of a temperature

detection object may turn into target temperature if it is in the sixth invention concerning this application A prohibition means is [the elapsed time from a heating halt of a heating object] below predetermined time die length, and when the abnormalities in detection of an abnormality detection means are memorized by the storage means, predetermined period prohibition of the electric power supply from a power source to a heating object is carried out.

[0022]

[Embodiment of the Invention] Hereafter, the gestalt of operation of this invention is explained based on an accompanying drawing.

[0023] (First operation gestalt) The gestalt of the first operation gestalt of this invention is first explained based on a drawing.

[0024] Drawing 2 is the typical sectional view showing the outline configuration of an example slack electrophotography laser beam printer 1 (it is hereafter called a printer 1 for short.) in which the image formation equipment of this operation gestalt is shown suitably.

[0025] A printer 1 is image formation equipment of the gestalt which performs a series of image formation processes of forming and recording the image according to the image information offered from image information offer equipments (not shown), such as a host computer formed in the exterior of the body of a printer 1, on the sheet-like record medium P, along with a well-known electrophotography method.

[0026] As a printer 1 is shown in drawing 1, the latent-image support slack photo conductor 2 which can rotate the shape of a drum, The primary electrification roller 8 which makes it the peripheral face of a photo conductor 2 charged in convention potential distribution, The laser scanner unit 5 (it is hereafter called a scanner 5 for short.) for forming the electrostatic latent image according to the above-mentioned image information in the peripheral face of a photo conductor 2 by exposure down stream processing according to the image information from a developer 3 and image information offer equipment The imprint object 6 which can rotate the shape of a roll for giving imprint down stream processing to a record medium P, and the record medium [finishing / imprint processing] P are equipped with the anchorage device 7 which performs fixation processing by heating and application of pressure.

[0027] If it is in this image formation equipment, while a photo conductor 2 has revolution actuation first started in the direction of an arrow head shown in drawing 1 with convention peripheral velocity, the peripheral face of a photo conductor 2 is made to be charged when the electrification roller 11 and photo conductor 2 with which convention bias is impressed **** each other by convention potential distribution.

[0028] Next, after the electrostatic latent image according to the above-mentioned image information is formed in the above-mentioned part by scanning and exposing a part [finishing / electrification processing of the peripheral face of a photo conductor 2] with a scanner 5 according to the image information from image information offer equipment, the above-mentioned electrostatic latent image is formed into a visible image by **** with the developer of a developer 3.

[0029] On the other hand, while being able to hold the record medium P of the number of predetermined leaves, it is conveyed to predetermined timing etc. in the space formed between the photo conductor 2 and the imprint object 6 of the feed roller 12 grade which can rotate freely from the cassette 11 supported free [removal] by the body of a printer 1.

[0030] As for the record medium P conveyed between a photo conductor 2 and the imprint object 6, the above-mentioned **** is imprinted with the imprint object 6.

[0031] And after fixation processing is performed by the anchorage device 7, a series of image formation processes will end the record medium [finishing / imprint processing] P by carrying out a laminating on the tray 14 which was delivered to outside the plane with the delivery roller 13 supported free [a revolution] by the body of a printer 1, and was attached in one side face of the above-mentioned body.

[0032] Next, an anchorage device 7 is explained based on drawing 2.

[0033] Drawing 2 is the block diagram showing the configuration of an anchorage device 7 and its control system.

[0034] The fixation object and the application-of-pressure object slack fixing roller 115,120 in which an anchorage device 7 carries out a pressure-welding revolution, The heating object slack heater

113,114 which generates heat in response to the power from a power source, and heats a fixing roller 115,120. The temperature detection object slack temperature sensor 116,117 which detects the skin temperature of a fixing roller 115,120. It has the control means 121 which controls the electric power supply from a power source to a heater 113,114 so that the detection temperature of a temperature sensor 116,117 turns into target temperature. The above-mentioned non-established image is fixed to the above-mentioned record medium by carrying out pinching conveyance, and pressurizing and heating the record medium which supports a non-established image with the above-mentioned fixation object and the above-mentioned application-of-pressure object.

[0035] Moreover, this anchorage device 7 is equipped with the malfunction detection means and the prohibition means slack heating prohibition decision means 118, the heating time information means slack timer 105, and the storage means 119.

[0036] Here, the heater 113,114 of an anchorage device 7 or the malfunction detection of a temperature sensor 116,117 is explained.

[0037] If it is in the control block 101 about anchorage device 7 control of a printer 1 as shown in drawing 2, the heating prohibition decision means 118 in a microcomputer 102 acquires real-time information by the communication link with a host 103 first. Next, the heating prohibition decision means 118 reads the heating time information 104 on heating initiation of a heater 113,114, and a heating halt from the storage means 119 which consists of EEPROMs etc.

[0038] Using the above-mentioned real-time information and the above-mentioned heating time information 104, it judges whether the heater 113,114 suited the heating idle state more than predetermined time die length, and when the heating idle state of a heater 113,114 is below predetermined time die length, it checks whether it is the temperature corresponding to the heating stop-time die length. That is, if the detection temperature of the temperature sensor 116,117 at this time is in a guarantee of operation, it will be regarded as normal and will return to the usual control.

[0039] However, when predetermined time die length has not passed since a heating halt of a heater 113,114, but the error log of the purport that a heater 113,114 and a temperature sensor 116,117 are unusual remains in the storage means 119, and the detection value of a temperature sensor 116,117 is low, after displaying a warning message and standing by predetermined time, reheating of a heater 113,114 is performed. This standby time is in an anticipated-use condition, must energize at a heater 113,114 from ordinary temperature, and must expect the temperature lowering of the fixing roller 115,120 of extent which can check the output of a temperature sensor 116,117 in a microcomputer 102.

[0040] In addition, if it changes into the application-of-pressure condition at the time of heating at a heater, since the temperature rise of the contact section will become large, a fixing roller pair may have the application-of-pressure discharge function of a roller pair, and may take the configuration which is not pressurized except the time of ****.

[0041] Moreover, when it is investigated whether the temperature detection value of a temperature sensor 116,117 has reached predetermined temperature at the time of the predetermined time set up by the timer 105 and the above-mentioned temperature detection value has not reached predetermined temperature from heating initiation of a heater 113,114, it is judged that it is unusual. It is possible that the heater 113,114 is disconnected or the temperature sensor is separated from a fixing roller as a cause of the abnormalities at this time etc.

[0042] If it is judged that it is unusual, heating of a heater 113,114 is suspended, and abnormalities will be transmitted to a host 103 or it will be displayed on a display panel (not shown). a heater 113,114 and a temperature sensor 116,117 tell an operator about an unusual purport promptly by this -- ** -- it becomes.

[0043] Here, if the printer 1 is connected with a network and the telephone line, the service call in online of it will become possible. Thereby, the quick management of exchange of a defect thermistor component etc. is attained.

[0044] Moreover, it is also possible to constitute so that storage maintenance of the storage means 119 being an abnormal condition may be carried out and incorrect actuation of a machine may be prevented until the above-mentioned abnormalities are canceled and an actuation halt of a heater 113,114 is canceled by the discharge means.

[0045] Here, the fixing roller 115,120 in an anchorage device is respectively heated at the heater

113,114. If these are controlled to the same temperature, if the temperature gradient of the temperature sensor 116,117 which detects such roller skin temperature is not settled in the predetermined range, it can judge that it is unusual.

[0046] Moreover, when a reclosing is carried out after intercepting a power source, it becomes detectable [an early stage] by changing malfunction detection time setting using the detection value of a temperature sensor 116,117, the storage information on the storage means 119, and real-time information.

[0047] A/D conversion is given to the temperature detection value of a temperature sensor 116,117 by A/D converter 107, and it is incorporated by the control means 121 in a microcomputer 102.

[0048] After the above-mentioned temperature detection value by which A/D conversion was carried out is removed in a noise by the LPF operation part 108, it is compared with the target laying temperature 106 by the comparator 109.

[0049] The decision output means 110 judges whether a heater 113,114 is heated based on the comparison result of a comparator 109, and outputs the result from a microcomputer 102 eventually.

[0050] On the other hand, without making a microcomputer 102 intervene, the overheating of a heater 113,114 is detected by the overheating prevention circuit 111, and heating of a heater 113,114 is suspended.

[0051] And the decision circuit 112 judges whether power is eventually supplied to a heater 113,114 from a power source based on the decision result of the heating decision means 110, and the overheating detection result of the overheating prevention circuit 111.

[0052] Here, it is compared with the temperature values (for example, temperature value quite lower than the environmental temperature of equipment etc.) which they cannot usually be as skin temperature of a fixing roller 115,120 at the time, and the skin temperature detection value of the fixing roller 115,120 by the temperature sensor 116,117 is judged to be unusual when low.

[0053] If it is judged that it is unusual, heating of a heater 113,114 will be suspended by the heating prohibition decision means 118, and exception processing will be made. As a cause of this abnormality, it is possible that the heater 113,114 is disconnected etc.

[0054] Moreover, since the detection temperature by the temperature sensor 116,117 may fall by poor mounting of a temperature sensor 116,117 even when predetermined temperature is once exceeded, when the minimum temperature after lifting to predetermined temperature is set up and it is less than it, it is also effective to judge that it is unusual. Otherwise, at the time of abnormalities, storage maintenance of the abnormal condition is carried out with the report of OBERETAHE by the display means, and a maintenance means, and the configuration which performs a heating halt of a heater 113,114 is considered until processing by the predetermined discharge means is performed.

[0055] Here, the flow chart of the control action in a microcomputer 102 is shown to drawing 3.

[0056] (Step 401) Real-time information is acquired by the power up by the communication link with a host 103.

[0057] (Step 402) The heating prohibition decision means 118 reads heating time information from the storage means 119.

[0058] (Step 403) From the above-mentioned real-time information and the above-mentioned heating time information, a heater 113,114 judges whether the heating idle state was suited beyond predetermined time, and if the heating prohibition decision means 118 is so, and it is not so, it will progress to step 406 to step 404.

[0059] (Step 404) It checks whether it is the temperature corresponding to what is obtained from heating time information, if the detection value of a temperature sensor 116,117 is so, it will progress to step 405, otherwise, it progresses to step 405.

[0060] (Step 405) The error message using the error log and heating time information which are saved for the storage means 119 is displayed on a panel (not shown), and host 103 HESUTETASU is transmitted. It progresses to step 406, after standing by in this condition until an error is canceled, or carrying out predetermined time standby, if a return is possible.

[0061] (Step 406) The detection value of a temperature sensor 116,117 is caused A/D-converter 107, and A/D conversion is carried out, and it is incorporated into a microcomputer 102.

[0062] (Step 407) The LPF operation part 108 gives low-pass filtering for noise rejection to the detection value of the temperature sensor 116,117 incorporated in the microcomputer 102.

[0063] (Step 408) If the temperature gradient of a temperature sensor 116,117 judges [whether the temperature gradient of a temperature sensor 116,117 is settled in the predetermined range, and] whether it is less than a predetermined value and it is judged that it is unusual, it progresses to step 409, and if it is not judged that it is unusual, it will progress to 410.

[0064] (Step 409) Error processing (the display of PANERUHE, status transmission to a host 103) is performed.

[0065] (Step 410) If it is judged by the comparator 109 whether the detection temperature of a temperature sensor 116,117 has reached target laying temperature and it has not reached by it, it progresses to step 411, and if it has reached, it will progress to step 412.

[0066] (Step 411) A heater is turned on and it returns to step 406.

[0067] (Step 412) A heater turns off and it returns to step 406.

[0068] Therefore, according to this operation gestalt, it prevents the temperature of fixing roller 115,120 front face rising more than malfunction resulting from the defect of the temperature sensor 116,117 for fixing roller 115,120 skin-temperature detection, or poor mounting of a temperature sensor 116,117, for example, a convention, curl of the paper accompanying it and generating of a jam are prevented, and effectiveness is acquired by prevention of equipment ****. Moreover, effectiveness is acquired by prevention of the poor fixation which happens since temperature does not reach predetermined temperature by the defect of a heater 113,114, and the poor contact.

[0069] (Second operation gestalt) Next, the second operation gestalt of this invention is explained based on a drawing. In addition, about the same configuration as the first operation gestalt, the same sign is attached and the explanation is omitted.

[0070] In addition to the same fixation device control as the first operation gestalt, if it is in this operation gestalt, by the control technique as shown in drawing 4 , fundamentally, the balanced place of a part from an anchorage device radiated heat and the energization rate of the heater per predetermined time is computed, it is heating with the energization rate, and unnecessary temperature fluctuation is suppressed.

[0071] From heating initiation of the power up of a heater 113,114, when predetermined temperature is exceeded, heating control which is shown by drawing 4 (a) and by which presetting was carried out is performed. This is set as the energization rate of holding the skin temperature of an anchorage device at 160 degrees C at the environmental temperature of 25 degrees C, and the time of supply voltage 100V. And the equilibrium temperature is detected and an energization rate is amended.

[0072] Here, the flow chart of the control action in a microcomputer 102 is shown to drawing 5 .

[0073] (Step 501) Real-time information is acquired by the power up by the communication link with a host 103.

[0074] (Step 502) The heating prohibition decision means 118 reads heating time information from the storage means 119.

[0075] (Step 503) From the above-mentioned real-time information and the above-mentioned heating time information, a heater 113,114 judges whether the heating idle state was suited beyond predetermined time, and if the heating prohibition decision means 118 is so, and it is not so, it will progress to step 406 to step 404.

[0076] (Step 504) It checks whether it is the temperature corresponding to what is obtained from heating time information, if the detection value of a temperature sensor 116,117 is so, it will progress to step 405, otherwise, it progresses to step 405.

[0077] (Step 505) The error message using the error log and heating time information which are saved for the storage means 119 is displayed on a panel (not shown), and host 103 HESUTETASU is transmitted. It progresses to step 406, after standing by in this condition until an error is canceled, or carrying out predetermined time standby, if a return is possible.

[0078] (Step 506) The detection value of a temperature sensor 116,117 is caused A/D-converter 107, and A/D conversion is carried out, and it is incorporated into a microcomputer 102.

[0079] (Step 507) The LPF operation part 108 gives low-pass filtering for noise rejection to the detection value of the temperature sensor 116,117 incorporated in the microcomputer 102.

[0080] (Step 508) If the temperature gradient of a temperature sensor 116,117 judges [whether the temperature gradient of a temperature sensor 116,117 is settled in the predetermined range, and] whether it is less than a predetermined value and it is judged that it is unusual, it progresses to step

409, and if it is not judged that it is unusual, it will progress to 410.

[0081] (Step 509) Error processing (the display of PANERUHE, status transmission to a host 103) is performed.

[0082] (Step 510) It judges whether it is more than heater heating control change laying temperature, if it is more than heater heating control change laying temperature, it will progress to step 512, and if the detection temperature of a temperature sensor 116,117 is below heater heating control change laying temperature, it will progress to step 511.

[0083] (Step 511) A heater is turned ON and it returns to step 406.

[0084] (Step 512) The detection temperature of a temperature sensor 116,117 judges whether it is below target temperature, if that is right, it will progress to step 413, otherwise, it returns to step 406.

[0085] (Step 513) Heating control of the heater 113,114 shown by drawing 4 is performed.

[0086] Drawing 4 shows heating control of the heater 113,114 in step 513 on the flow chart of drawing 5. The default of drawing 4 (a) shows ON of the heater 113,114 by the heating rate balanced with a part from presetting or the anchorage device 7 measured at the time of the last control radiated heat at the time of the shipment saved for the storage means 119, such as EEPROM, and an OFF state.

[0087] About this period, it is necessary to make it the period (for it to become the amount of fluctuation which does not become a process top problem) which does not appear in the temperature change on the front face of a heater and, and the responsibility of a heater and the effect of FURIKKAHE must be taken into consideration. By having fixed spacing in the timing made into the ON state of a heater 113,114, the source effect influenced by this is made small.

[0088] Here, since a heater 113,114 is usually directly supplied from an AC power line, it will be influenced of the line voltage variation by the area, an environment, etc. Moreover, it will be influenced by solid-state dispersion and environmental temperature, and the effect of a worm uptime becoming late etc. will arise. Although it can act as the monitor of supply voltage and the environmental temperature and they can also be processed in order to ease these effects, the additional components for it are needed.

[0089] So, always suitable heating control is [as opposed to / the energization rate per predetermined time] realizable [by changing the account of an energization hand] with this operation gestalt during control with the difference of the detection value of the temperature sensor 116,117 several minutes after changing into the energization rate, and target temperature (default temperature corresponding to the energization rate) (drawing 4 (b), (c)). Otherwise, it is possible to attach a "on" period to each energization cycle like drawing 6 about the control technique of a supply heating value.

[0090] Moreover, it is setting up a lost heating value using information, such as a paper type, width of face, and die length, at the time of ****, and adding to this energization period at it, and it becomes possible to suppress the temperature fluctuation at the time of **** small.

[0091] That is, when a control means 121 enables modification of the energization period per predetermined unit time amount of heater 113,114 HE, by changing this energization period with the detection value and target temperature of a temperature sensor 116,117 which are stabilized, it builds according to operating environment temperature and operating supply voltage, and the temperature change on the front face of a fixing roller at the time of temperature control is suppressed by performing optimal heating control.

[0092] Therefore, according to this operation gestalt, it prevents the temperature of fixing roller 115,120 front face rising more than malfunction resulting from the defect of the temperature sensor 116,117 for fixing roller 115,120 skin-temperature detection, or poor mounting of a temperature sensor 116,117, for example, a convention, curl of the paper accompanying it and generating of a jam are prevented, and effectiveness is acquired by prevention of equipment ****. Moreover, effectiveness is acquired by prevention of the poor fixation which happens since temperature does not reach predetermined temperature by the defect of a heater 113,114, and the poor contact.

[0093] Moreover, according to this operation gestalt, the effectiveness of suppressing temperature fluctuation of fixing roller 115,120 front face at the time of temperature control is acquired by performing optimal heating control according to operating environment temperature and operating

supply voltage by changing the energization period per unit time amount of a heater 113,114 with the detection value and target temperature of a temperature sensor 116,117 which are stabilized.
[0094]

[Effect of the Invention] As explained above, according to the first invention concerning this application, a prohibition means Since predetermined period prohibition of the electric power supply from a power source to a heating object is carried out when the elapsed time from a heating halt of a heating object is below predetermined time die length and the abnormalities in detection of an abnormality detection means are memorized by the storage means Prevention of the overheating of a heating object or poor fixation by an open circuit of a temperature detection object and a heating object, a poor contact, etc. can be aimed at.

[0095] According to the second invention concerning this application, moreover, a malfunction detection means In case the time amount die length of the heating idle state from cutoff of the power from a power source to a heating object to a reclosing is below predetermined time die length, when the detection temperature of a temperature detection object is lower than the temperature corresponding to the drop temperature of the heating object based on the above-mentioned time amount die length from the detection temperature of the temperature detection object at the time of cutoff of the above-mentioned power Since predetermined period prohibition of the electric power supply from a power source to a heating object is carried out when the elapsed time from a heating halt of a heating object is [a prohibition means] below predetermined time die length and the abnormalities in detection of an abnormality detection means are memorized by the storage means while detecting abnormalities The abnormalities of the temperature detection object after the reclosing of the above-mentioned power or a heating object can be detected at an early stage, and prevention of the overheating of a heating object or poor fixation by an open circuit of a temperature detection object and a heating object, a poor contact, etc. can be aimed at.

[0096] Furthermore, while according to the third invention concerning this application a control means changes the energization period per unit time amount of the power from a power source to a heating object so that the detection temperature of a temperature detection object may turn into target temperature Since predetermined period prohibition of the electric power supply from a power source to a heating object is carried out when the elapsed time from a heating halt of a heating object is [a prohibition means] below predetermined time die length and the abnormalities in detection of an abnormality detection means are memorized by the storage means Prevention of the overheating of a heating object or poor fixation by an open circuit of a temperature detection object and a heating object, a poor contact, etc. can be aimed at, and prevention of worm uptime delay of the heating object by fluctuation of the operating environment temperature of equipment or operating supply voltage can be aimed at further.

[0097] Moreover, since predetermined period prohibition of the electric power supply from a power source to a heating object carries out according to the fourth invention concerning this application when the elapsed time from a heating halt of a heating object is [a prohibition means] below predetermined-time die length and the abnormalities in detection of an abnormality detection means are memorized by the storage means, prevention by the overheating of a heating object or poor fixation by an open circuit of a temperature detection object and a heating object, a poor contact, etc. can plan.

[0098] According to the fifth invention concerning this application, furthermore, a malfunction detection means In case the time amount die length of the heating idle state from cutoff of the power from a power source to a heating object to a reclosing is below predetermined time die length, when the detection temperature of a temperature detection object is lower than the temperature corresponding to the drop temperature of the heating object based on the above-mentioned time amount die length from the detection temperature of the temperature detection object at the time of cutoff of the above-mentioned power Since predetermined period prohibition of the electric power supply from a power source to a heating object is carried out when the elapsed time from a heating halt of a heating object is [a prohibition means] below predetermined time die length and the abnormalities in detection of an abnormality detection means are memorized by the storage means while detecting abnormalities The abnormalities of the temperature detection object after the reclosing of the above-mentioned power or a heating object can be detected at an early stage, and

prevention of the overheating of a heating object or poor fixation by an open circuit of a temperature detection object and a heating object, a poor contact, etc. can be aimed at.

[0099] Moreover, while according to the sixth invention concerning this application a control means changes the energization period per unit time amount of the power from a power source to a heating object so that the detection temperature of a temperature detection object may turn into target temperature Since predetermined period prohibition of the electric power supply from a power source to a heating object is carried out when the elapsed time from a heating halt of a heating object is [a prohibition means] below predetermined time die length and the abnormalities in detection of an abnormality detection means are memorized by the storage means Prevention of the overheating of a heating object or poor fixation by an open circuit of a temperature detection object and a heating object, a poor contact, etc. can be aimed at, and prevention of worm uptime delay of the heating object by fluctuation of the operating environment temperature of equipment or operating supply voltage can be aimed at further.

[Translation done.]

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the typical sectional view showing the outline configuration of the image formation equipment concerning the first operation gestalt of this invention.

[Drawing 2] It is the block diagram showing the configuration of the anchorage device with which the image formation equipment of drawing 1 is equipped, and its control system.

[Drawing 3] It is a flow chart for explaining the control system of the anchorage device in the first operation gestalt of this invention.

[Drawing 4] It is drawing for explaining control of the power supplied to a heating object from the power source in the second operation gestalt of this invention.

[Drawing 5] It is a flow chart for explaining the control system of the anchorage device in the second operation gestalt of this invention.

[Drawing 6] It is drawing for explaining control of the power supplied to a heating object from the power source in the second operation gestalt of this invention.

[Description of Notations]

1 Printer (Image Formation Equipment)

7 Anchorage Device

105 Timer (Heating Time Information Means)

113,114 Heater (heating object)

115,120 Fixing roller (a fixation object, application-of-pressure object)

116,117 Temperature sensor (temperature detection object)

118 Heating Prohibition Decision Means (Prohibition Means, Abnormality Detection Means)

119 Storage Means

121 Control Means

P Record medium

[Translation done.]

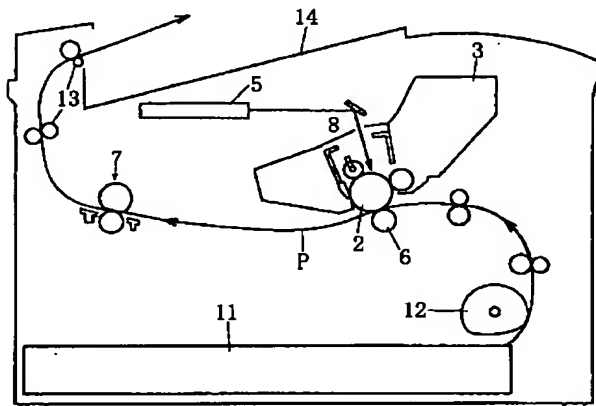
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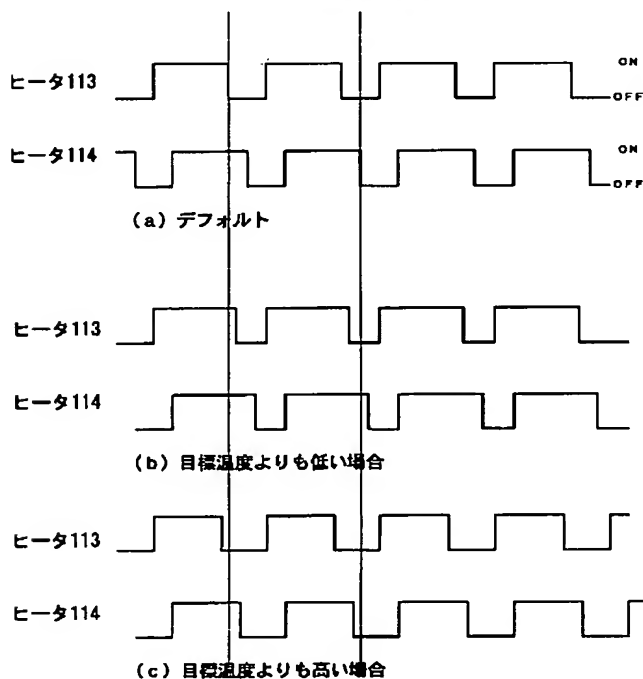
DRAWINGS

[Drawing 1]

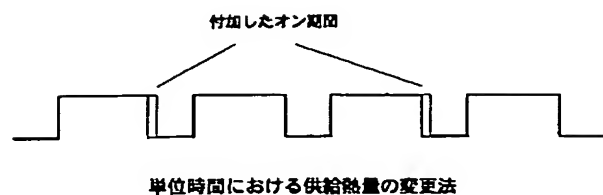


[Drawing 4]

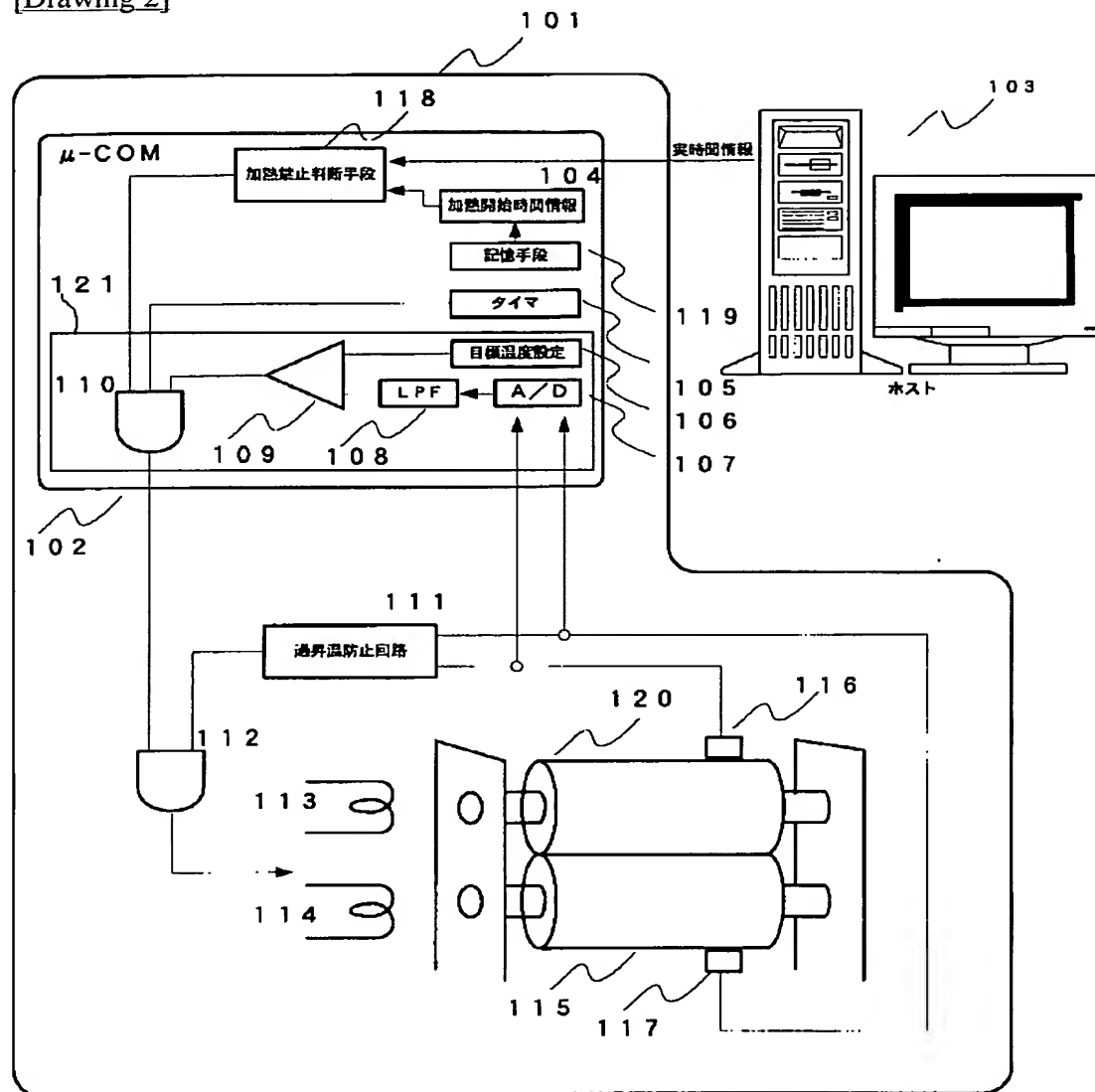
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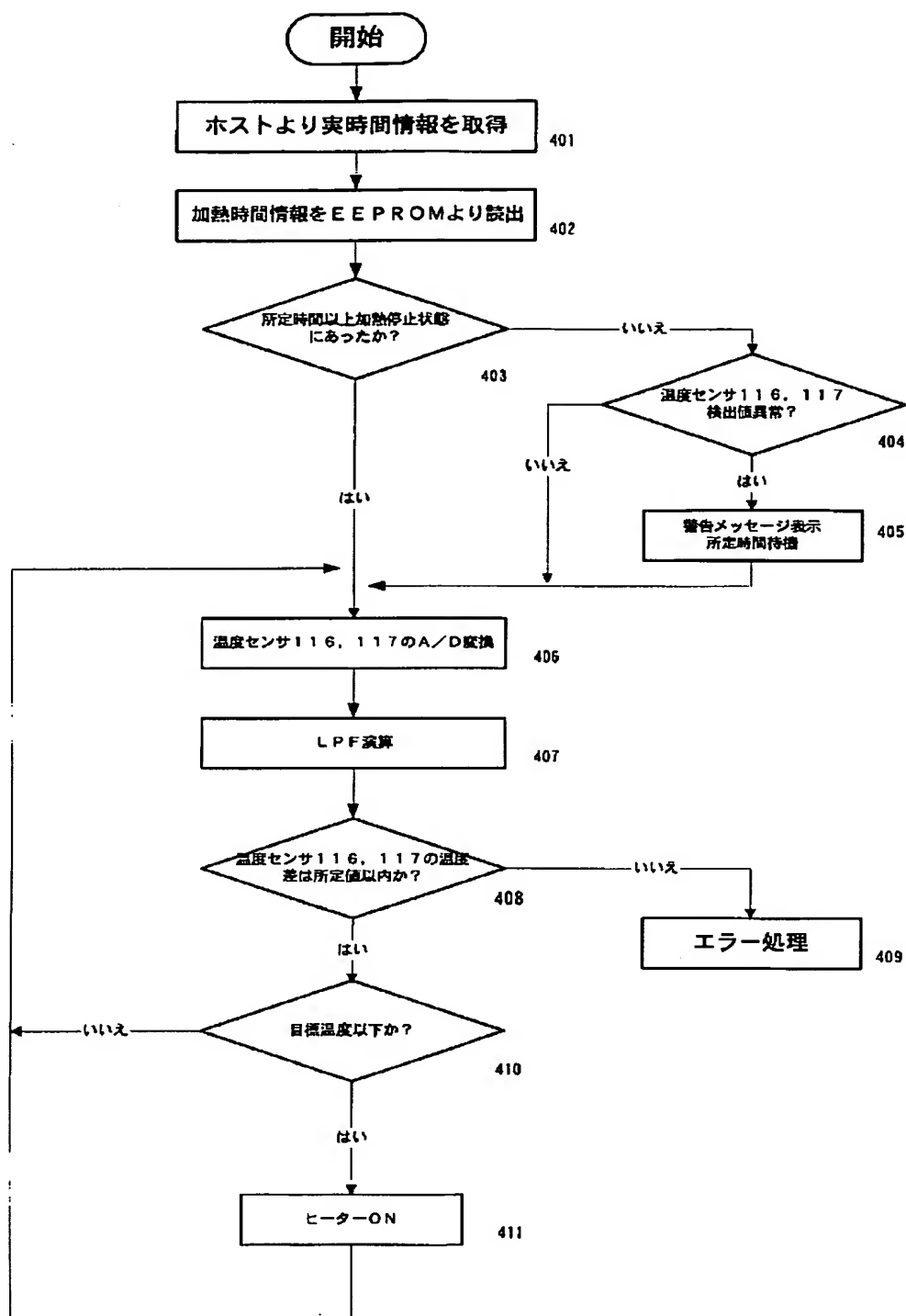
[Drawing 6]



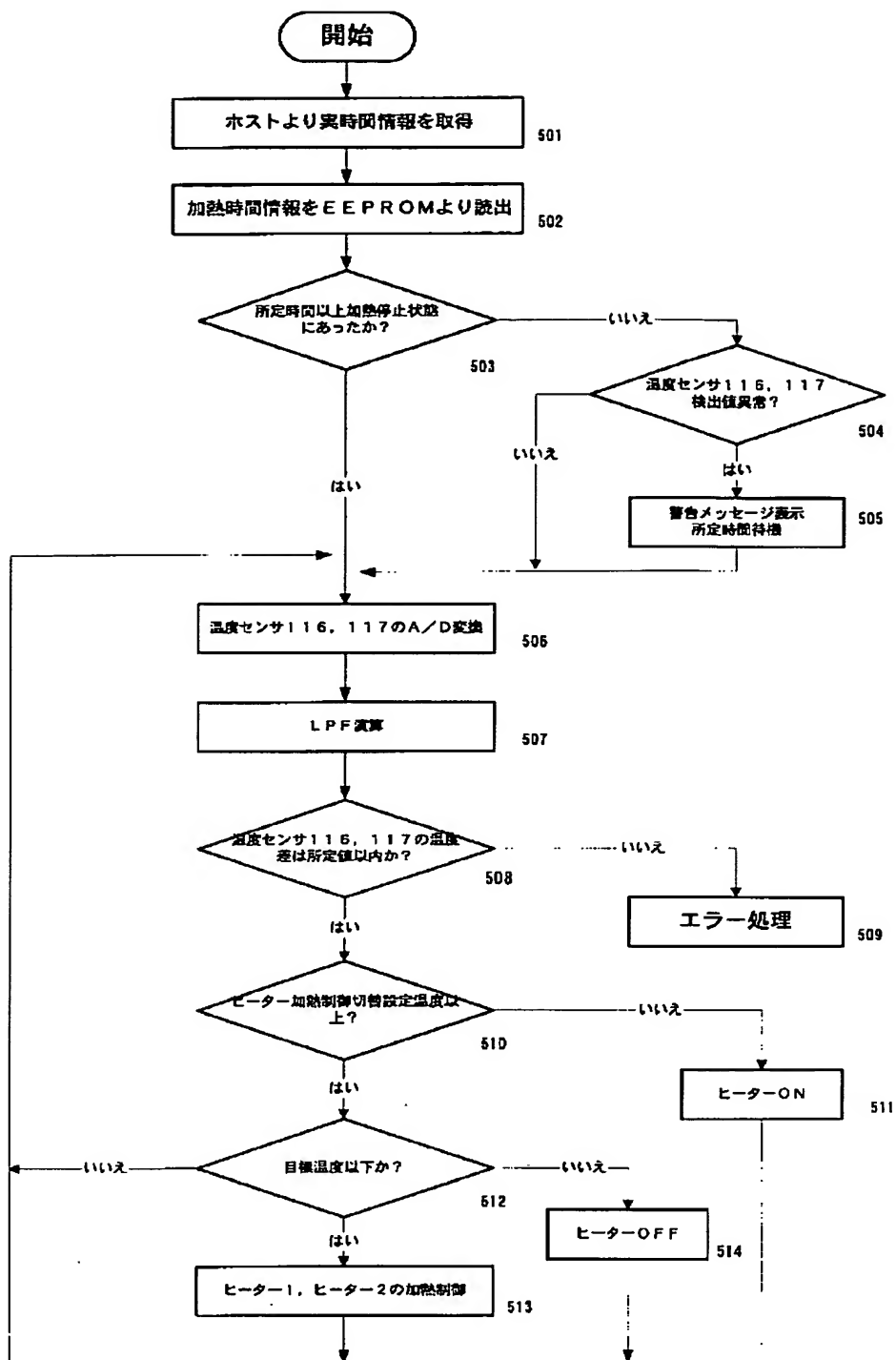
[Drawing 2]



[Drawing 3]



[Drawing 5]



[Translation done.]